

REFORMED WORSHIP DESIGN INCORPORATING POSITIVE NEUROPLASTICITY

A Practical Research Project
presented to
the Faculty of
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In Partial Fulfillment
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Doctor of Ministry

by
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Abstract

Reformed Worship Design Incorporating Positive Neuroplasticity

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Neuroscience research has learned many things about how the human brain is wired and can be re-wired to enhance both positive and negative behaviors. This project explores the incorporation of small changes into the existing worship design typical of the Presbyterian Church (USA) that could lead to positive rewiring in the brain of worshippers for more compassion and joy.

Transformation of worshippers has been a goal of worship since its beginning in the New Testament and the Reformed tradition has emphasized the continual reformation of the church. This project reviews that history and theology particular to the Presbyterian Church (USA).

This project proposes involves three separate worship services – a control and two different interventions within worship. It

- (i) highlights the potential of incorporating neuroscience into worship design;
- (ii) proposes and describes four small changes to the design of a worship service that could lead to positive outcomes of worshippers having more capacity for joy and compassion, both for themselves and for others;
- (iii) Explores the survey data taken after each of these worship services;
- (iv) serves as a resource for communities seeking ways to adapt worship to positive neuroplasticity.

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Introduction

Since the Protestant Reformation in the 16th century, the format of reformed worship has remained largely the same. The hymnody has expanded over time and the language in the liturgies has changed over the centuries but overall, the basic flow has remained the same. In the Presbyterian tradition of which I am a part there is a four-fold worship order described as:

(1) Gathering – which often includes a Call to Worship, Hymn of Praise, Confession and Pardon and Passing the Peace,

(2) The Word – which can include Prayer for Illumination, Scripture Readings, Sermon, Affirmation of Faith and Prayers of the People,

(3) The Eucharist – which may include Offering, Communion of the People and Lord's Prayer, and

(4) Sending – which may include songs of commitment and charge and blessing.¹ There is value and beauty in this tradition and wisdom from generations of saints of the Church.

However, the pieces of this worship were constructed in a radically different context than the one we find ourselves in today. Worship in 16th century Europe was for largely illiterate people who did not own Bibles. Worship today is attended by literate, Bible-owning people who have decreased attention spans. There are people who find the traditional forms of worship to be life-giving and helpful resources in their relationship with God and their understanding of the salvific acts of Jesus Christ. As is evidenced by the decreasing numbers of those attending worship services, there are many people who do not find what they are looking for in terms of

¹ “The Order of Worship—F.A.Qs,” Presbyterian Church (U.S.A.), accessed December 5, 2025, <https://pcusa.org/order-worship-faqs>.

positive impact upon their life in the worship services offered today. Re-examining our worship service elements with the contemporary audience in mind is important because worship is a central piece of the reformed expression of faith.

Origins of this Project

This idea for this project began several years ago as an extension of my ministry. In April of 2019, I was researching a sermon on Matthew 28:19-20 about evangelism and wanted to think as broadly as possible about what evangelism might look like. I came across an article about mirror neurons and how we can impact one another even without a word. In the sermon, I said, “Our positive behaviors can ripple out and affect others in every moment of our day. Our brains have truly been designed by our creator to have wireless connection with one another. We are learning in science that we don't process the world alone, we co-process our reality.” This was the beginning of my thoughts on how neuroscience intersects with theology.

Then in June of 2023, I took a course on Trauma and Spiritual Care. In that class the instructor spoke about how corporate singing calms our nervous system. The claim was that our worship services can have a positive healing effect on our bodies and the trauma we have endured. This was another place where I began to wonder if worship already has positive effects whether it could be tweaked to show even more positive results for the healing and behavior of worshippers.

That same year, a congregant shared with me the book *The Awakened Brain: The New Science of Spirituality and Our Quest for an Inspired Life* by Lisa Miller. In this book, Miller uses scientific data such as MRI studies, genetic research and epidemiology to suggest that humans are equipped with a capacity for spirituality that enhances our lives when we tap into it.

This book continued to inspire to think about how science can teach us how spirituality can help enhance our lives.

Finally, in August of 2023 I attended an online course through Spiritual Directors International entitled “Awakening Joy” taught by Harry Pickens. Pickens introduced me to the concept of positive neuroplasticity and shared neuroscience findings about practices that can increase our capacity for joy and compassion. This was the impetus for my desire to undertake this project and enroll in the Spiritual Renewal, Contemplative Practice and Strategic Leadership Doctor of Ministry program at the Claremont School of Theology.

This project is designed to be one experiment in our collective attempts to be a church that is reformed and ever reforming. I am fascinated by what I continue to learn about neuroscience and how researchers are discovering the impact of spirituality on our brain as well as how our brains continue to grow and change and how we process information and incorporate new experiences into our neurological framework. The more I learn the more I want to share that knowledge with the church and think about how it could impact what we do and how we help people heal, find joy, feel gratitude, forgive, and work for justice. I am passionate about the church and its capacity to help people live lives of meaning.

This project is designed to be part of the larger conversation about changes in corporate worship. Fellow pastors, theologians, worship leaders and congregants can learn from this research new insights about how we can think about worship design in a new way incorporating new information.

Theological and Theoretical/Conceptual Stance

I worked within the basic frameworks of worship format within the PC(USA) and work

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with the basic tenets of reformed theology to create my project. For example, the fourfold order to worship that includes Gathering, The Word, Eucharist and Sending. Another basic tenet that I assumed is that Scripture is central to what we do when we gather for worship.

In terms of leadership, I created a worship design and support materials that any Minister of Word and Sacrament could understand and that they could use these materials in their own setting.

Definitions – Delimitations, and Limitation

This project looks at worship practices and theology as understood in the Presbyterian Church (USA). I did not explore theology or practice or leading worship services outside of the PC(USA) context.

One of the things I argue is that the aim of worship is to create union with God and to transform worshippers to be more like Jesus. Specifically, I am looking at elements within a PC(USA) worship service that could lead to union with God and being more like Jesus.

Obviously, there are many aspects of Jesus' identity that could be explored when thinking about how contemporary worshippers become more like Jesus. Specifically, I am exploring two aspects – joy and compassion. I will look at how worshippers can be more like Jesus by being more joyful and compassionate.

I am defining joy as something different than happiness. While feeling happy might occur because of a particularly pleasant occurrence, theologically, joy is something more foundational. As described in a Presbyterian Outlook article about Presbyterian understanding of joy, "Joy is the work of the Spirit among us. Joy is the sense of confidence that radiates from a church that is secure in the promise that no matter what size or shape they are, they are the Body

of Christ.”² Joy is one of the fruits of the Holy Spirit described in Galatians 5:22. The Greek word for joy is *chara* translates to joy, gladness, or delight. Joy is an assurance of God’s presence (union with God) that allows us to be resilient and face suffering. As a fruit of the Holy Spirit, joy is evidence of a heart transformed by God.

Becoming more joyful is to be more like Jesus because joy surrounds Jesus’ life and ministry. The arrival of Jesus on earth was said to be news of great joy for all people (Luke 2:10). Many times Jesus told his followers to rejoice, such as in Matthew 5:12. In the gospel of John, Jesus says that he is teaching so that the joy of Jesus would be with his followers and that their joy would be complete (John 15:11). Jesus desires his followers’ joy.

Compassion and joy are related but also different. I am defining compassion as Dr. Andrew Dreitcer does in his book *Living Compassion* as an understanding, feeling and action. In the Christian tradition, we understand God as the source of compassion, we feel in our bodies the experience of another and we act in an attempt to alleviate suffering.³ By growing in compassion we become more like Jesus because Jesus was compassionate. As Dr. Frank Rogers says in *Compassion in Practice*, “This path of Jesus – summed up as loving God with every dimension of our being, cultivating an authentic love for ourselves, and loving our neighbors as ourselves – was, at its core, a way of radical compassion.”⁴ As we practice compassion and become more like Jesus, these compassion practices can also increase our joy.

² Caitlin Deyerle, “Joy or Happiness?” *The Presbyterian Outlook*, updated May 2, 2022, <https://pres-outlook.org/2015/12/51164/>.

³ Andrew Dreitcer, *Living Compassion: Loving Like Jesus* (Upper Room Books, 2017), 22.

⁴ Frank Rogers Jr., *Compassion in Practice* (Upper Room Books, 2016), 12.

The Buddhist tradition holds that, “compassion practices over time naturally produce various experiences of joy.”⁵ It is important to note that it is in knowing God that the foundation of these practices is formed. We begin with knowing that God is love and loves us. This knowledge allows us to grow in our joy and compassion. As Makransky and Condon note, “The ritual and contemplative practices of these spiritual traditions began not with oneself trying to become more loving and compassionate just on one’s own but with awareness that you and your world are held in the care, compassion, and wisdom of a field of spiritual presence and power.”⁶

The final limitation to note is that the questionnaires I used examine the effects from a one-time worship experience. I did not look at long term effects. I only looked at the self-reported experience of participants and not at any actual change in brain activity using fMRI or other tools.

⁵ John Makransky and Paul Condon, *How Compassion Works: A Step-by-Step Guide for Cultivating Well-Being, Love, and Wisdom* (Shambhala, 2025), 176.

⁶ Makransky and Condon, *How Compassion Works*, 10.

Chapter 1

Conditions

The purpose of Christian worship is to help worshippers grow in the qualities that Jesus has shown us as the way to be his disciples. Worship transforms the worshipper, as we recognize God's presence, and hear the words of Scripture, we are formed. In this study, I propose that we use what we are learning in neuroscience to construct our worship in such a way that it more fully carries out the transformative purposes for which it is intended. Historically, the church has used what it knew of human experience to attempt to construct worship that would be transformative. For example, hymns were used to teach theology and pieces of Scripture because music helps us retain information as we sing. As we learn more about how our brains are wired and can be rewired, we can use that knowledge to craft our worship to transform worshippers into more compassionate and joyful people.

John Calvin asserted that the ultimate purpose of Christian worship is union with God.⁷ In his Commentary on Psalm 24:7 he wrote, "What is the design of the preaching of the Word, the sacraments, the holy assemblies, and the whole external government of the church, but that we may be united to God."⁸

When we are united with God, when we experience God's presence with us, we are changed. Those changes can be experienced in our behavior, our emotions, our thoughts and knowledge, our relationships and our bodies.

⁷ James F. White, *Introduction to Christian Worship* (Abingdon Press, 2000), 23.

⁸ John Calvin, *Commentary on the Book of Psalms*, trans. and ed. by James Anderson (Edinburgh, 1845), 1:410.

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If in worship we experience God's presence and that experience leaves us transformed, why wouldn't we use what we are learning in neuroscience about how humans change, how our brains can be re-wired, how neuroplasticity can work for good, to incorporate into our worship design the practices that lead us to experience more compassion and joy?

One reason might be that there are many people who find the traditional forms of worship that are currently practiced in many churches to be life-giving and helpful resources in their relationship with God and their understanding of the salvific acts of Jesus Christ. In my research, I will inquire about how worshippers report their current levels of joy and compassion. As de Soto describes in *How God Works*, religious communities have been crafting worship experiences for centuries by noticing what elements work in people's lives to help them have experiences of union with God.⁹

However, as is currently evidenced by the decreasing numbers of those attending worship services, there are many people who do not find what they are looking for in terms of positive impact upon their life in PC(USA) worship services. De Soto in *How Good Works* notes, "People are looking now, as they always have, to religion as a source of support, but not finding exactly what they need. But as many turn away from organized religion – sometimes with good reason, depending on the failings of the institution in question – they're losing tools meant to ease their way of life. And even for those who wish to remain associated with a traditional faith, the tools those faiths offer might benefit from some tweaks."¹⁰ We know the tools of faith can enhance people's lives. Ryan Burge, a scholar of religion and politics says, after reviewing Pew Research

⁹ David DeSteno, *How God Works: The Science Behind the Benefits of Religion* (Simon and Schuster, 2021), 14.

¹⁰ DeSteno, *How God Works*, 186.

data on parents and religion, “Church going parents feel less stress and fatigue than those who don’t attend a house of worship.”¹¹ Yet we also know that many people, particularly Millennials, are no longer looking to the church as a place to find spiritual answers and communion with God.¹²

Re-examining our worship service elements with the contemporary audience in mind is important because worship is a central piece of the reformed expression of faith. My hope is that this project will be one experiment in our collective attempts to be a church that is reformed and ever reforming.

Christian worship has been around since the beginning of the church. It has looked very different over the centuries in different contexts and populations. The *Introduction to Christian Worship* describes Christian worship very broadly as “a repeated social behavior with definite purposes.”¹³

In my Reformed tradition, specifically in the way that it is lived out in the Presbyterian Church (USA), we have theological documents that describe why we do what we do in worship. We have as part of our Constitution, a Directory for Worship that describes how we understand what worship is in our time and place for our current context.

At the beginning of that document, it says that in worship we glorify God. We glorify God by acknowledging God’s active presence among us. We glorify God by the way we live as

¹¹ Ryan Burge, “Parenting Isn’t Easy—but Faith Might Help a Little,” The Association of Religion Data Archives, September 23, 2025, <https://www.thearda.com/categories/ahead-of-the-trend/parenting-isnt-easy-but-faith-might-help-a-little>. Bold type removed.

¹² TryTank Research Institute, *Young Adult Parents: What Happens to Faith When “Nones” Have Kids: Comprehensive Findings Report*, May 2025, 18, https://www.trytank.org/uploads/1/2/3/4/123491645/young_adult_parents_research_trytank.pdf.

¹³ White, *Introduction to Christian Worship*, 19.

we are sent out for the rest of the week. “We are gathered in worship to glorify the God who is present and active among us. . . . We are sent out in service to glorify the same God who is present and active in the world.”¹⁴ This Directory for Worship reflects the conviction that “the faith, life, and worship of the Church are inseparable.”¹⁵

In the PC(USA), worship is not seen as something we only do on Sundays for one hour in a sanctuary. “Christian worship and service does not end at the conclusion of the Service for the Lord’s Day; we go forth to love and serve the Lord in daily living. In so doing, we seek to fulfill our chief end: to glorify and enjoy God forever.”¹⁶

Ancient Christian writer Ireneaus writes that “the glory of God is a human fully alive. Nothing glorifies God more than a human being made holy; nothing is more likely to make a person holy than the desire to glorify God. Both the glorification of God and the sanctification of humans characterizes Christian worship.”¹⁷

We say that worship is not ultimately to glorify God for just one hour but to build us up to be able to serve in the world to the glory of God. The “Directory for Worship” states, “Every action in worship is to glorify God and contribute to the good of the people.”¹⁸

How do we contribute to the good of the people? I would argue that the people are made good as they are able to more and more respond to God and God’s people in ways that are loving

¹⁴ Presbyterian Church (U.S.A.), *Book of Order, 2025–2027*, part 2 of *The Constitution of the Presbyterian Church (U.S.A.)* (Interim Unified Agency, 2025), W-1.0101, https://pcusa.org/sites/default/files/2025-08/2025_0724_Book_of_Order_Interactive_2025-2027.pdf.

¹⁵ Presbyterian Church (U.S.A.), *Book of Order*, 78.

¹⁶ Presbyterian Church (U.S.A.), *Book of Order*, W-3.0503.

¹⁷ White, *Introduction to Christian Worship*, 24.

¹⁸ Presbyterian Church (U.S.A.), *Book of Order*, W-2.0202.

and joyful. The good of the people is achieved in them having moments of presence and acquiring the practices and skills that will make their lives better. When their lives are improved, the lives of their neighbors, families, coworkers, enemies and strangers will also be positively impacted.

The Directory for Worship says that our response to God's presence is to be transformed and renewed. Our response to God is to be equipped to be God's servants in the world. "Christian worship joyfully ascribes *all* praise and honor, glory and power to *the triune God*. In worship, the people of God *acknowledge God present* in the world and in their lives. As they *respond to God's claim and redemptive action in Jesus Christ*, believers are transformed and renewed. In worship, the faithful *offer themselves to God* and are equipped for *God's service* in the world."¹⁹

And yet, since the Protestant Reformation in the 16th century, the format of reformed worship has remained largely the same. "The invention of printing brought about a situation unknown before, the possibility of liturgical standardization."²⁰ The hymnody has expanded over time and the language in the liturgies written has changed over the centuries but overall, the basic flow has remained the same. "Today, Protestants and Roman Catholics alike see standardization as a false goal. What may have been liberating in the sixteenth century seems stifling in the twentieth."²¹ Over the centuries, a few things have changed, but the basic elements have remained very much the same. "The 1993 Presbyterian Service of the Lord's Day

¹⁹ "What Do Presbyterians Believe About Worship?" Presbyterian Church (USA), Presbyterian Mission, accessed September 12, 2025, <https://centernet.pcusa.org/what-we-believe/worship7/>.

²⁰ White, *Introduction to Christian Worship*, 41.

²¹ White, *Introduction to Christian Worship*, 42.

represents greater historical consciousness of early patterns and yet reflects Reformation tendencies.”²²

There is value and beauty in this tradition and wisdom from generations of saints of the Church. However, the pieces of this worship were constructed in a radically different context than the one we find ourselves in today.

Calvin and others were constructing worship for a largely illiterate population. Literacy rates were below 20% of the population at that time.²³ Most households did not own their own Bible. There were not electronic amplification systems, let alone screens and videos. The content of the faith needed to be shared through spoken words and static images like sculpture, painting and architecture. Today’s context could not be more different. The United States now has a literacy rate of almost 80%.²⁴ With the advent of the internet, most people have access to vast swaths of information, not only Bibles, but commentaries, sermons, blogs, podcasts and a gargantuan amount of Christian content. Information and images can be consumed on screens of various sizes, sent to every corner of the world. With the advent of so much technology, our attention spans have decreased.²⁵ With such massive changes in context, why wouldn’t we change how we worship to rhythms that better suit how our society has changed, and how we process and absorb information and experiences now?

²² White, *Introduction to Christian Worship*, 161.

²³ Tyrel C. Eskelson, “States, Institutions, and Literacy Rates in Early-Modern Western Europe,” *Journal of Education and Learning* 10, no. 2 (2021): 109.

²⁴ “US Literacy Statistics,” Magnet ABA, February 28, 2025, <https://www.magnetaba.com/blog/us-literacy-statistics#:~:text=The%20U.S.%20currently%20ranks%2036th,the%20U.S.%20literacy%20education%20system>.

²⁵ Kevin McSpadden, “You Now Have a Shorter Attention Span Than a Goldfish,” *TIME*, May 14, 2015, <https://time.com/3858309/attention-spans-goldfish/>.

A common phrase in the Presbyterian Church (USA) as we lift up our Reformation heritage is the Latin phrase *Ecclesia reformata, semper reformanda* which can be translated “The church reformed and always being reformed. We are a Reformation people who also want to be reforming and conforming to the Word of God.

The Presbyterian Church (USA) website describes this understanding of reformation this way, “We acknowledge that the church even at its best is a frail and fallible human institution. We know that we “hold these treasures in earthen vessels.” Edward Dowey, another church historian, has written that reform is the institutional counterpart of repentance. Recognizing how far short we fall from God’s intentions, we continually submit all doctrines and structures to be reformed according to the Word of God and the call of the Spirit. The church is a frail and fallible pilgrim people, a people on the way, not yet what we shall be. The church, because of who we are, remains open to always being reformed. *The Presbyterian Confession of 1967* underscores this teaching: “As God has spoken his word in diverse cultural situations, the church is confident that he will continue to speak through the Scriptures in a changing world and in every form of human culture.”²⁶

“The backward and forward reference of reform invites us on the one hand to attend respectfully to the wisdom and Scriptural interpretations of those who have gone before us with humility. On the other hand, it pushes us to do more than simply reiterate what fathers and mothers in the faith have said. Rather, we must do in our day what they did in theirs, worship and serve the living God. Therefore, while we honor the forms of faith and life that have been

²⁶ Anna Case-Winters, “*Ecclesia Reformata, Semper Reformanda*: Our Misused Motto,” Presbyterian Church (USA), accessed September 12, 2025, <https://pcusa.org/ecclesia-reformata-semper-reformanda>.

bequeathed to us, we honor them best in a spirit of openness to the Word and the Spirit that formed and continue to re-form the church. The church, because of who God is, a living God, remains open to always being reformed.”²⁷

In *How God Works*, DeSteno suggests there are three paths available to us as we consider old traditions and new information. We can revert to the old ways of doing things and lean into our traditions, we can reject the old way of doing things, or we can reformulate our practices based on new information. The third way is the one I choose: reforming, open to new pathways.

I want to honor the forms of faith that have been bequeathed to us and to be open to new ways to express and experience our faith. I am fascinated by what I continue to learn about neuroscience and how researchers are discovering the impact of spirituality on our brain as well as how our brains continue to grow and change and how we process information and incorporate new experiences into our neurological framework. The more I learn, the more I want to share that knowledge with the church and think about how it could impact what we do and how we help people heal, find joy, feel gratitude, forgive, and work for justice. I am passionate about the church and its capacity to help people live lives of meaning.

The fourfold order of worship that has been bequeathed to us from previous generations of Christians can be retained even as we re-examine which elements of our current worship practice continue to serve the needs of modern-day worshippers. For example, we know that corporate singing and corporate prayer both have positive effects on the brain.²⁸ Those current practices can be maintained. There is also evidence that breath practices and gratitude practices have a positive

²⁷ Case-Winters, “*Ecclesia Reformata, Semper Reformanda*.”

²⁸ David DeSteno, *How God Works: The Science Behind the Benefits of Religion* (Simon and Schuster, 2021), 100.

impact on our neural networks.²⁹ While those practices are a part of Christian experience, they are not always a focus of contemporary worship experiences and could be brought back into practice. Many of the practices that we already do, like confession and passing of the peace, can be reframed with the scientific knowledge we have now about how our brains work. Emphasizing the tangible practices that we already have (like communion and baptism) and bringing in more engagement of the senses could be another way to incorporate our knowledge of how our brains are most impacted. Preaching has often been seen as the central act of Presbyterian worship. Thomas G. Long, preaching professor and author, has written that the passive stance that many assume at the sermon time needs to be upended. He says that the “business of the individual preacher is to enable the church to preach.”³⁰ What would preaching look like if we saw it as less passive with the intent to transform the worshippers into disciples whose lives preach the gospel? One of my proposed tweaks to worship will address this question.

In the Presbyterian Directory for Worship, it is recognized that worship is meant to transform our whole lives. It says, “In personal life we seek to live out our faith through daily disciplines of prayer, other practices of discipleship, household worship, and Christian vocation and service. Our lives as Christians are shaped by the Word and empowered by the Spirit as we grow more and more each day into the image of the Lord Jesus Christ.”³¹ This project will attempt to look at tweaks to worship that can use neuroscience to help worshippers grow more

²⁹ Roland Zahn, “Individual Differences in Posterior Cortical Volume Correlate with Proneness to Pride and Gratitude,” *Social Cognitive and Affective Neuroscience* 9, no. 11 (2014): 1676-83.

³⁰ Thomas G. Long, “The Perilous and Promising Pulpit,” *The Presbyterian Outlook*, November 2, 2023. <https://pres-outlook.org/2023/11/the-perilous-and-promising-pulpit/>.

³¹ Presbyterian Church (U.S.A.), *Book of Order, 2025–2027*, part 2 of *The Constitution of the Presbyterian Church (U.S.A.)* (Interim Unified Agency, 2025), W–5.01, https://pcusa.org/sites/default/files/2025-08/2025_0724_Book_of_Order_Interactive_2025-2027.pdf.

and more in the image of Jesus – specifically in the areas of joy and compassion. By incorporating practices and knowledge from neuroscience, I hope to explore how we can increase our capacity to live with more joy and compassion which I contend is a way that we can glorify God.

Chapter 2

Resources

In this chapter I will share research from neuroscience about positive neuroplasticity and the practices that have proven effective in aiding qualities that are also values within Reformed Christianity. I will look at what elements of worship that are already commonly used are supported by recent neuroscience as aids for well-being. I will propose a worship design that incorporates 3-4 changes that I hypothesize will lead to more positive effects in the lives of the worshippers.

I want to pay attention to how positive neuroplasticity can be used in conjunction with Presbyterian theology. David Zahl, author of the 2019 book *Seculosity*, about the many replacement religions in today's society, warned: "A spirituality of wellness can fall into 'prosperity' theology fairly easily, once you start equating physical health, or even mental health, with holiness. What hope is there for the sick and paralyzed and declining and dying folks among us, or those who cannot seem to get well no matter how hard they try?"³² But Zahl hesitated to pass judgment in a world where people are hurting more than ever. "We need more than just a new diet or exercise regime to address our pain. A true integration could be really cool."³³ Zahl's warning against a prosperity theology and his charge to integrate well-being with theology appropriately are two ideas I am trying to incorporate into my work. I want to steer clear of a prosperity theology or a works righteousness theology by which people focus their attention on earning their salvation through their own behavior. At the same time, I do want to

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³² Ellie Davis, "A Church Where Wellness Meets Spirituality," *The Presbyterian Outlook*, June 20, 2024, <https://pres-outlook.org/2024/06>.

³³ Davis, "A Church Where Wellness Meets Spirituality."

lift up what neuroscience can teach us about well-being because it aligns with and can contribute to the goals of worship, namely to transform, renew, and equip us to be God's servants in the world.

There are churches already that are experimenting with incorporating meditation and physical wellness into their worship. One example is The Well in New York City. The Reverend Daniel Castelo at Duke Divinity School said churches like The Well could catch on as people take more seriously what a holistic approach to caring for people can look like. "Christianity does not have a running theme of self-care in its orbit, apart from the language and notion of Sabbath," said Castelo. "But in a culture like ours in which people are spent, stressed and burned out, this approach has a logic and appeal to it, especially for urbanites."³⁴ I believe that when we share with worshippers how worship helps their well-being on a neurological level and connect that to our theology, this will resonate and increase the impact of our worship practices.

Our Changing Brains

There is a lot of good news coming from the field of neuroscience in terms of how our brains can be changed. Scientists are learning that our brains are more plastic, or changeable, than previously thought: throughout our lives, our neural circuitry is influenced by our conditioning; we react to input in conditioned ways. The good news is that we have the ability to override or change when our current circuitry when it's responses no longer serve.³⁵ We can change not only the function of our brains but also its very structure. What we pay attention to each day is having a physiological effect on our bodies, and what we practice grows stronger.

³⁴ Ellie Davis, "A Church Where Wellness Meets Spirituality," *The Presbyterian Outlook*, June 20, 2024, <https://pres-outlook.org/2024/06>.

³⁵Fleet Maul, "Our Algorithmic Brain", Positive Neuroplasticity: A Self-Leadership Course, Heart Mind Institute.

Like a muscle, our brains can be strengthened; parts of it can grow stronger with practice. Our cells have memory.³⁶

Created by God, we can be co-creators with God of our own reality. We can all be neural architects through self-directed neuroplasticity. We can help our brains become more plastic and changeable; with intention we can rewire our brains in ways that better serve us and are more aligned with our values. We can sculpt our brains to be more attuned to the things we want to be attuned to and more resilient when faced with experiences that are difficult.

Neurogenesis, the biological process of forming new neurons, is a process that occurs mostly during embryonic development but continues to occur throughout our lifetime. For example, scientists are discovering that our “left brain/right brain” integration increases in our 50s and peaks in our 80s.³⁷ This is good news for all of us because it means that our ability to change and grow neurologically in ways that align with our faith does not have an end date. We can grow more Christ-like every day until the day we die when we will be fully united with Christ consciousness.

Through repetition of certain activities, our brains learn and rewire. Donald Hebb even famously posited that neurons that fire together wire together.³⁸ We can look to contemplatives throughout the ages who have known that certain practices had great effect in living a life close to God. What we are now learning is the neuroscience behind what centuries of experience have

³⁶ Jennifer Frazier, “Can A Cell Remember?” *Scientific American*, May 28, 2021, <https://www.scientificamerican.com>.

³⁷ Steven Kotler, “Believing Myths About Aging Makes Growing Old Worse,” *TIME*, August 11, 2023, <https://time.com/6303537>.

³⁸ D. O. Hebb, *The Organization of Behavior: A Neuropsychological Theory* (Wiley, 1949).

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taught. In David DeSteno's book *How God Works*, he speaks of "religioprospecting."³⁹ This is the idea that we can look at what practitioners of religion have been doing for centuries and then use scientific research to determine why those particular rituals or practices are helpful.

Religious Connection to Neuroscience

In my research, I have found many resources that tie neuroscience to Buddhism, but I am beginning to see more resources connecting Christianity with neuroscience just in the last two years.⁴⁰ In my work, I am trying to use positive neuroplasticity for the sake of Jesus Christ and the kingdom of God, specifically within Presbyterian worship. Crucially, there is more and more scientific evidence that "religion can boost physical and mental well-being."⁴¹ Using objective measures that science appreciates, studies show links between those who practice religion and better blood pressure, cardiac function, and mental health diagnoses.⁴² There are also studies that show how the placebo effect, where it is simply the brain talking to the brain with no outside chemicals, is able to produce results for healing.⁴³

This is not only true in regard to physical health markers. As David DeSteno says, "Religions aren't just a club; they work on the brain in deeper ways. Praying, singing and moving together nudge the mind to create and strengthen social bonds."⁴⁴ I believe that our minds are actually healthiest when they are connected to God. In her book *Awakened Brain*, Dr.

³⁹ David DeSteno, *How God Works: The Science Behind the Benefits of Religion* (Simon & Schuster, 2021), 11.

⁴⁰ For example, Jim Wilder and Michel Hendricks, *The Other Half of Church: Christian Community, Brain Science, and Overcoming Spiritual Stagnation* (Moody Publishers, 2020).

⁴¹ DeSteno, *How God Works*, 115.

⁴² DeSteno, *How God Works*, 117.

⁴³ DeSteno, *How God Works*, 130.

⁴⁴ DeSteno, *How God Works*, 120.

Lisa Miller makes a strong case for our ability to re-wire our brains for greater well-being. She says,

Everyone of us has the ability to fully develop our innate capacity to live through an awareness of love, interconnection, and appreciation of life's unfolding. Beyond belief, beyond a cognitive story we tell ourselves, the awakened brain is the inner lens through which we access the truest and most expansive reality: that all of life is sacred, that we never walk alone. Our brains are wired to perceive and receive that which uplifts, illuminates, and heals.⁴⁵

Miller is using what science has learned about other aspects of our brain to make theological connections. "The ventral attention network is where we see that the world is alive and talking to us; the frontotemporal network is where we feel the warm, loving embrace of others and of life itself; the parietal lobe is where we know we matter, belong, and are never alone."⁴⁶

Miller is finding research that supports an understanding of our ability to impact minds other than our own through mirror neurons and connections we don't yet understand. She asks a deceptively simple question: "What if our brains were less like idea generators and more like antennae or docking stations for a larger consciousness?"⁴⁷

Process theology is also trying to tie our theological understanding with how God works. I agree with theologian Thomas Hosinski when he says that "God endows each actual agent of the universe with its relevant possibilities at the beginning of its process of becoming."⁴⁸ He

⁴⁵ Lisa Miller and Weigand Esme Schwall, *The Awakened Brain: The New Science of Spirituality and Our Quest for an Inspired Life* (Random House, 2021), 10.

⁴⁶ Miller and Schwall, *The Awakened Brain*, 162.

⁴⁷ Miller and Schwall, *The Awakened Brain*, 201.

⁴⁸ Thomas Hosinski, *The Image of the Unseen God: Catholicity, Science, and Our Evolving Understanding of God* (Orbis, 2017), 127-133.

continues “The actual agent has an “initial aim”, part of the endowment it receives from God.”⁴⁹ “When an actual agent actualizes the possibility God values most highly for that situation, it can rightly be called an act of God; but it is also rightly understood to be the act of the agent itself within the universe.” We are co-creators with God and when we live out our calling as Jesus’ disciples we are cooperating with God’s will. Hosink says, “God uses power in beautiful ways to empower and to persuade toward ultimate beauty and goodness.”⁵⁰ Both through our brain’s wiring and through persuasive power that we experience but cannot measure, God is inviting us into a life of beauty and goodness.

Theology to Science

I believe that Scripture can point to many of the concepts that neuroscience is showing are key factors in how our brains wire and rewire. In the Hebrew Bible, the concept of breath (*ruach*) is important: God breathes over the waters at the beginning of creation (Genesis 1:2, NRSV), and everything that breathes is implored to praise the Lord (Psalm 150:6, NRSV). In the New Testament, the word for breath is also the word for Spirit, *pneuma*. The breath animates and it transforms. The spirit of life/breath is everywhere. Throughout the Bible, breath is transformative. Importantly, we now know that breathing practices can calm our nervous system. Within neuroscience, much research has been shown about the power of breathing practices. For example, Dr. Christine Runyan suggests that a long exhale can calm our sympathetic nervous

⁴⁹ Hosinski, *The Image of the Unseen God*, 127-133.

⁵⁰ Hosinski, *The Image of the Unseen God*, 127-133.

system.⁵¹ With every breath, we can sense God's presence, we can remember God's gift of breath, and we can connect to God through our breath.

Scientists are also learning that there are certain practices that can increase our neuroplasticity, with the number one practice being regular exercise. This would not be a good fit for a traditional Presbyterian worship service. However, another is mindfulness, where we focus our awareness on the present moment. There are many mindfulness practices we can incorporate into a worship service. A third way that we can increase our neuroplasticity is through regulating our nervous system. We can incorporate activities that serve as a parasympathetic reset which helps activate our internal systems for rest and digest. These activities, such as breathing exercises, gentle movement, and focusing on touch, help us relax and lower our blood pressure.⁵² There are many breathing and mindfulness techniques, as well as listening to music, which can assist with this and increase our neuroplasticity.

Incarnation is a key theological concept within Reformed Christianity. In Jesus, God has entered human form. Jesus understands us because Jesus became flesh and lived among us. As such, our bodies are a way of experiencing God. In worship, our two sacraments are physical practices: in baptism, we use water as a symbol and pour it over a person's head, and in communion we eat and drink together. Additionally, we stand and sit, we sing, and we shake hands or hug as we pass the peace during worship. I believe that neuroscience tells us that the more we can be in tune with what is happening within our bodies when we practice our faith, the

⁵¹ Christine Runyan, "On Healing Our Distressed Nervous Systems," interview by Krista Tippett, *On Being with Krista Tippett*, March 18, 2021, last updated May 30, 2024, <https://onbeing.org/programs/christine-runyan-on-healing-our-distressed-nervous-systems/>.

⁵² Emad Estamalik, "How to Reset Your Vagus Nerve Naturally," Cleveland Clinic, December 23, 2025, <https://health.clevelandclinic.org/vagus-nerve-reset>.

more that will help our brains re-wire in positive ways. Somatic experiences that pay attention to the sensations and physical perceptions of our body can be great teachers and healers. As Dr. Christine Runyan says of this type of somatic experience,

So scent and sound can be really pretty accessible tools to just send those messages of comfort or safety. And then we can work with the body, too, the body quite directly, to send messages of safety and of calming to our nervous system. So our body is this incredibly rich, textured source of data for us. But we can also intentionally be in postures, be in ways that the nervous system senses safety. So a very simple one — and we could do it now, together — is just putting your feet on the floor so that your legs are uncrossed, and your feet are fully making contact with the Earth, maybe pressing down through the heel, pressing through the balls of the feet, feeling a little of that sensation coming up through the legs, and feeling yourself in your seat, being held.⁵³

Jesus says, “I came that they may have life, and have it abundantly” (John 10:10, NRSV). I understand an abundant life as one full of wholeness and well-being. Concerning embodiment, the resurrection of Jesus and the promise of our resurrection is central to our faith. Resurrection is evidence of new life. In a similar way, we are learning from neuroscience that we can create new neural networks all the time. We can generate new connections, in other words we can create new life, even signs of resurrection in our brains that can lead us to more resilience, compassion and joy. The promise of resurrection is built within our cells.

Another key concept is sanctification. Through the action of the Holy Spirit in our lives we can grow in joy and compassion. Breath exercises can increase positive neuroplasticity and contribute to our growth.⁵⁴ As our ability to grow and change in positive ways can develop, this

⁵³ Runyan, “On Healing Nervous Systems.”

⁵⁴ Goldy Yadav and Pratik K. Mutha, “Deep Breathing Practice Facilitates Retention of Newly Learned Motor Skills,” *Scientific Reports* 6 (2016): 37069, <https://doi.org/10.1038/srep37069>.

means we can grow in our likeness of Christ. Practices that increase positive neuroplasticity can be a way of using our brains to become more compassionate and joyful.

Admonitions to Consider

There are cautions I want to make as we think about the possibilities of positive neuroplasticity being a way that God works. First, rewiring our brains for more positive experience does not mean we can avoid difficult things. It does not mean that we can pretend that there isn't suffering in the world. Positive neuroplasticity is not a panacea that heals all wounds, fixes all behaviors, makes all things better. Nonetheless, we can use positive neuroplasticity but it doesn't mean that living on this planet is any easier.

Second, just because we can improve our behavior and experience with positive neuroplasticity does not mean that we are earning our salvation with good behavior. We get better because of how God made us, not from our own innate goodness.

Third, we want to be well because being well makes us better disciples. The focus is not ultimately on our individual wellness but what our wellness can help us accomplish for the world and that God desires our wholeness. We are wired for connection and community, so seeking these qualities must always be done not just for ourselves but for a wider purpose.

Finally, another caution is against a mindfulness that can actually harm, and/or a mindfulness that is removed from empathy and loving kindness. Such a mindfulness is about suppressing emotions instead of processing them.⁵⁵ I believe that mindfulness can make us more

⁵⁵ Dhanesh D. Binda et al., "What Are Adverse Events in Mindfulness Meditation?" *Global Advances in Integrative Medicine and Health* 11 (Jan.–Dec. 2022): 2, <https://doi.org/10.1177/2164957X221096640>.

compassionate and connected, as well as increase our positive neuroplasticity, but it must be done in ways that heal rather than harm.

Worship Elements

There are practices that people of faith have been engaged in for thousands of years and even without neuroscience they have realized that those activities have been helpful. One of the practices that has long been known to help is how singing together can reduce chronic pain, increase attitudes of generosity and levels of oxytocin in the brain.⁵⁶ Singing together releases endorphins and mitigates feelings of loneliness.⁵⁷ What is more, singing has been shown to synchronize the heartbeats of those singing together and create a sense of community and social inclusion.⁵⁸ Long before anyone could prove it scientifically, singing together has been experienced as something that helps.

Another practice is prayer. People who pray together accelerate the rate at which fellow worshippers activate neuropathways of a prayerful state.⁵⁹ For example, structured prayers like the Lord's Prayer reduce our respiration rate.⁶⁰ Holding hands, as is often done in prayer, reduces physical pain. Even praying for those far away has been shown to neurologically impact the recipient of prayer. "Achtenberg drew the conclusion that it's possible for compassionate healing

⁵⁶ Francis Collins, "Opera Legend Renee Fleming Teams Up with Dr. Francis Collins to Study How Music Can Improve Health," interview by Jeffrey Brown, PBS News Hour, PBS, February 22, 2024, <https://www.pbs.org/newshour/show/geneticist-and-opera-singer-team-up-to-study-how-music-can-improve-health>.

⁵⁷ R. I. M. Dunbar et al., "Performance of Music Elevates Pain Threshold and Positive Affect: Implications for the Evolutionary Function of Music," *Evolutionary Psychology* 10, no. 4 (2012): 688-702. <https://doi.org/10.1177/147470491201000403>.

⁵⁸ DeStono, *How God Works*, 101.

⁵⁹ Lisa Miller, *The Awakened Brain: The New Science of Spirituality and Our Quest for an Inspired Life* (Random House, 2021), 198.

⁶⁰ DeStono, *How God Works*, 100.

intentions sent at a distance to have a direct physical effect on the recipient – that when we are bonded, we can influence one another’s bodies and mental process.”⁶¹

What has been learned about neuroplasticity also confirms the practice of confession within worship. If our brains were static and unchangeable, coming before God and repenting our sins could seem futile because we would know that we were doomed to repeat them. However, knowing that we can change our behavior, that we are created neurologically with brains that can change and behavior that can change, means that we can come to confession knowing that change and repentance are truly possible.⁶²

In general, when during worship we speak about why we do what we do, the purpose of life as we understand it as disciples of Jesus and what gives us meaning, this also can help us on a neurological level. According to Stephanie Wagner, the director of Learning and Development for Healthy Minds Innovations, there are benefits of living a life of purpose for the body, mind, and behavior, including greater resiliency to stress, decreased incidents of stroke and heart problems, an increase in life satisfaction, positive emotions, overall psychological well-being, and an increase in caring behaviors, academic performance, and volunteering.⁶³ “Reminding ourselves of [our] values can do things like help us to reduce worrying; it can help increase our positive emotions and even decrease stress hormones in the body.”⁶⁴

⁶¹ Miller, *The Awakened Brain*, 165.

⁶² Lisa Schrott, “Repentance: Synaptic Plasticity in Action,” *The Presbyterian Outlook*, September 9, 2022, <https://pres-outlook.org/2017/10/repentance-synaptic-plasticity-action/>.

⁶³ Stephanie Wagner, “A Life of Meaning,” Healthy Minds Learning Lab, webinar, posted March 14, 2024, by Humin, YouTube, 10:13–11:23, <https://www.youtube.com/watch?v=yWT2ILG3XsY>.

⁶⁴ Wagner, “A Life of Meaning,” 23:39–23:54.

The final thing that churches have done for a long time that we now know has neurological benefit is to invoke awe. For example, through the beauty of sanctuaries and stirring music Christians have tried to evoke awe. We now have the science to say that this changes our neural networks.⁶⁵ To make this point, author Cole Arthur Riley says,

I think awe is an exercise, both a doing and a being. It is a spiritual muscle of our humanity that we can only keep from atrophying if we exercise it habitually. I sit in the clearing behind [my home] listening to the song of the barn swallows mix with the sound of cars speeding by. I watch the milk current through my tea and the little leaves dance free from their pouch. I linger in the mirror and I don't look away.... Awe is not a lens through which to see the world but our sole path to seeing. Any other lens is not a lens but a veil. And I've come to believe that our beholding—seeing the veils of this world peeled back again and again, if only for a moment—is no small form of salvation.⁶⁶

Proposed Tweaks

While there is much that is being learned about how to increase our positive neuroplasticity, only some of these findings fit well within a traditional Presbyterian worship service. Given this, I propose a few minor tweaks to worship design that may help worshippers be more affected in positive ways.

The first is to begin worship with a breath practice. This could be inviting the congregation to take one long breath before the Call to Worship. A focus on our breath, as well as extending our breaths, have been found to help us regulate our nervous system and can tie into our Christian understanding of God's gift of breath. A focus on breath can help with mindful

⁶⁵ Summer Allen, "Eight Reasons Why Awe Makes Your Life Better," *Greater Good Magazine*, September 26, 2018, https://greatergood.berkeley.edu/article/item/eight_reasons_why_awe_makes_your_life_better.

⁶⁶ Cole Arthur Riley, "The Spiritual Practice of Awe," *The Center for Action and Contemplation*, December 7, 2023, <https://cac.org/daily-meditations/the-spiritual-practice-of-awe/>.

awareness, which is foundational to how we employ practices that encourage joy and compassion.

The second is to use our time of greeting one another (which we call Passing of the Peace) to truly try to connect with one another using mirror neurons. This is a somatic practice where we shake hands (or touch elbows during flu season) and look one another in the eye. It is common to say, “The peace of Christ be with you” and for the other person to reply, “And also with you.” We know that mirror neurons are cells in the brain that are activated when they see someone doing something. As such, I would like to explore whether we can use this time of Passing of the Peace to look one another in the eye and smile at one another in order to impact their neural cells to truly feel more connected as a somatic practice. Feelings of connection can increase our joy and compassion.

The third is to rethink the preaching moment. Fundamentally, preaching needs to be more participatory. Presbyterian preaching professor and author Tom Long said, “Preaching a sermon is something that the whole gathered assembly does together, a unified act of ministry. Yes, the preacher prepares and delivers the words of the sermon, as a division of labor – but equally important are the listeners, the role they play and how they prepare to hear and receive.”⁶⁷ Given the communal nature of preaching, I would like to experiment with how listeners hear and receive the sermon. One option is to include a mindfulness exercise as part of the preaching time. Within a guided meditation, we can use mental imagery, memory reconsolidation, practices to help worshippers be impacted more. The meditation could include using mental imagery of how

⁶⁷ Thomas Long, “The Perilous and Promising Pulpit,” *The Presbyterian Outlook*, November 2, 2023, <https://pres-outlook.org>.

we might act like Jesus in the coming days. This has been shown to be a motivational amplifier, increasing the chances that people's behavior will change in the positive ways they desire.⁶⁸

The fourth tweak is to use what we know about prayer. We know that prayers we already do, like common prayers and praying together, help us neurologically. What I'd like to do is increase the emphasis on gratitude and joy in the prayers during worship. The goal is to explore how it works neurophysiologically toward joy. When we focus on gratitude for what God has given us, it helps us expand neural pathways of joy. The more gratitude and joy we experience, the more we will notice it, and the more joy we have, the better we can weather life's storms.

The final tweak is to end the worship service by taking a moment to metabolize the service--to take in the good and to savor what we have done so that it impacts us more.⁶⁹ This is a practice that I learned about from Rick Hanson's book *Hardwiring Happiness*. Already, a Presbyterian worship service ends with a charge or benediction encouraging the congregation to live out their Christian faith. With this tweak, the congregation would take 60 seconds to focus their awareness on the worship we had just experienced in an effort to savor its benefits so that they might more powerfully transform us.

Conclusion

What we have learned through neuroscience about positive neuroplasticity is exciting and relevant to a life of faith. Many of the practices we are now able to prove positively impact the

⁶⁸ Fritz Renner et al., "Mental Imagery as a 'Motivational Amplifier' to Promote Activities," *Behaviour Research and Therapy* 114 (March 2019): 51–59, <https://doi.org/10.1016/j.brat.2019.02.002>.

⁶⁹ Rick Hanson, *Hardwiring Happiness: The New Brain Science of Contentment, Calm, and Confidence* (Penguin Random House, 2013), 176.

brain have been known by religious communities for centuries. Tweaks can be incorporated into Reformed worship design and can impact worshippers to help their brain increase in joy and compassion.

Chapter 3

Research

In this chapter, I will share the methodological steps I took to design, implement, and collect data for my research project. I will discuss the creation of the surveys, highlight the scope and limitations of this project, present the results and offer a few conclusions that I have drawn from the project and the potential impact for the wider church.

In my project, I am interested in how worship transforms and specifically if what we are learning in neuroscience about positive neuroplasticity can be used in a reformed worship to transform worshippers in the ways we seek to be transformed to be more like Jesus.

I am limited in what is available to me in order to test the changes within a worshipper's brain. Because I do not have access to fMRI machines nor do I have the expertise to use them, I knew that my data was going to need to be self-description and not images of what is happening in brains. There are limitations with self-reported data. Self-reported data is inherently subjective and there are unconscious biases that we all have that can impact the data. Relying on each subject's understanding and interpretation of each question as well as whether they may be biased in their response means that the data that I collected is somewhat limited.

I chose a Likert scale as my survey tool to try and capture any nuanced changes in subject's sense of whether worship had impacted them in some way. I wanted it to be simple and easy so that I could capture as many respondents as possible. Initially, I had planned to do one worship service experiment in several different congregations and do a Likert scale before worship and after worship to compare. In conversation with my advisor, Dr. Andrew Dreitcer, I decided that it would be better to do a series of Likert scale surveys across three different

worship services. I crafted the Likert scale to include six simple questions. I also asked for names and email addresses, whether the participant worshipped in-person or via livestream and whether the participant was open to speaking further about the experience. The four Likert scales are presented in Appendix A.

Because I had decided to use only one congregation for this research, I opted to use First Presbyterian Church in Portland, Oregon. This church is where I was serving as the interim pastor and where I could most easily lead three worship services. I chose the dates for the services to be in April and May because of the church calendar and which Sundays would be most possible for this experiment. First Presbyterian Church in Portland, Oregon is a congregation with the PC(USA) denomination. They are a congregation of about 400 members with anywhere from 120 – 175 people in-person in worship on a Sunday with another 30-45 worshipping via livestream. They are a congregation that values traditional worship which for them looks like using the Revised Common Lectionary, having a worship liturgy that is very similar to the standard Book of Common Worship Service of the Lord's Day, choral and organ music with occasional piano and handbells used as well. All of the worship leadership typically takes place from the pulpit and the Ministers of Word and Sacrament wear robes and stoles.

I communicated with the congregation through our weekly e-mail newsletter and announcements from the pulpit that I would be conducting this experiment and asking for volunteers. I had 30 participants sign the release form and fill out the first Likert scale. The participants were all members or regular attenders of First Presbyterian Church, Portland, Oregon ranging in age from their 30s into their 80s. They were evenly split between men and women. All participants signed a consent form indicating their willingness to participate. A copy is provided in Appendix J.

I asked participants to fill out a survey at the beginning of the experiment outside of worship to get a baseline of their responses to the questions. I then asked them to fill out the scale directly after three different worship services. In the first worship service, conducted on April 26, 2025 nothing was changed about the format and content of worship so I was measuring how they responded immediately after worship when worship was what they expected. In the second worship service conducted on May 4, 2025, the bulletin had sidebars that described briefly some of the neuroscience that has been learned that related to each part of worship. In the third worship service conducted on May 11, 2025, , the bulletin remained the same as a typical Sunday but I described and led several different exercises within the worship service. The three bulletins are presented in Appendix B.

In this beginning Likert scale, there was already a strong sense of worship being transformational. Figure 1 below shows their response to the statement “I feel a strong capacity for joy.

I feel a strong capacity for joy.
30 responses

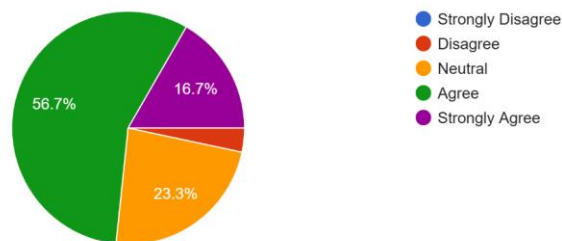


Figure 1: Responses to Survey Question 1

In response to question 1: 56% (17 people) agreed that they had a strong capacity for joy in their lives. 16.7% (5 people) strongly agreed with that statement. 23.3% were neutral on the question and only 1 disagreed. Unfortunately, the person who disagreed with the statement that they had a strong capacity for joy in their lives did not fill out any further surveys so I was unable to track whether the worship interventions had an impact on their self-assessment.

In their sense of being able to be compassionate to others they were even stronger. Figure 2 below shows their response to the statement “I feel able to be compassionate to others.”

I feel able to be compassionate to others.
30 responses

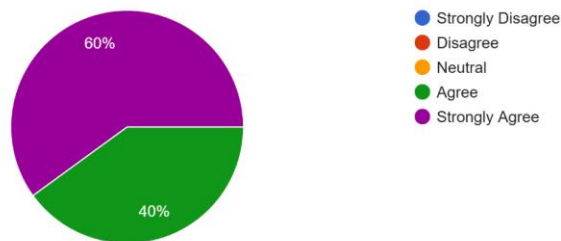


Figure 2: Responses to Survey Question 2

In response to question 2: 40% agreed with their ability to be compassionate while 60% strongly agreed.

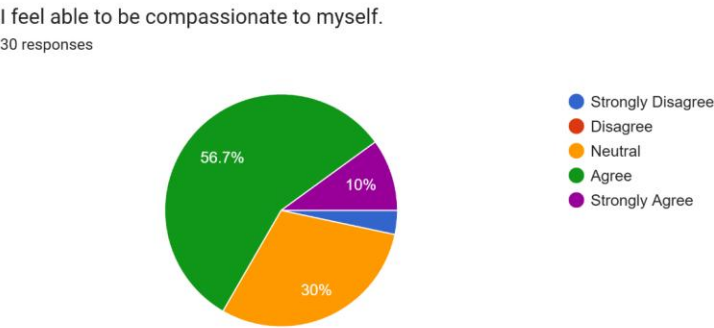


Figure 3: Responses to Survey Question 3

As Figure 3 shows, when it came to being compassionate to themselves, they were more mixed. 56.7% agreed with this statement and 10% strongly agreed while 30% were neutral on this question and one person strongly disagreed.

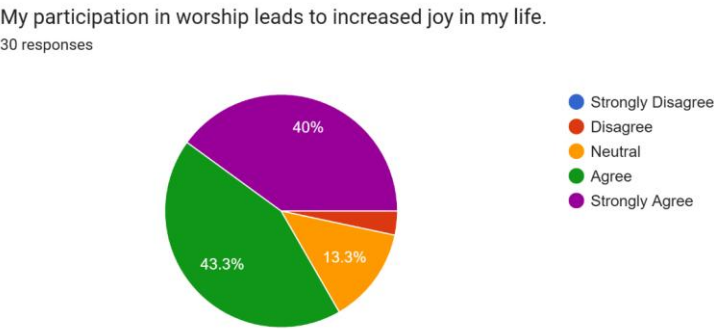


Figure 4: Responses to Survey Question 4

When it came to whether participation in worship increased joy in their life, over 80% agreed or strongly agreed (43.3 and 40%) while 13.3% were neutral and 3.3% disagreed. They were slightly stronger on whether participation in worship increased their ability to be compassionate.

My participation in worship leads to increased compassion in my life.
30 responses

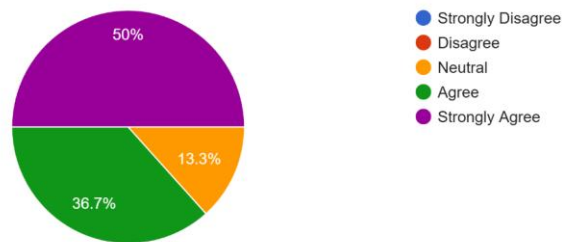


Figure 5: Responses to Survey Question 5

As Figure 5 shows, 86.7% agreed or strongly agreed while 13.3% were neutral and none disagreed.

The respondents were strongest in agreement with the statement “Worship improves my life.”

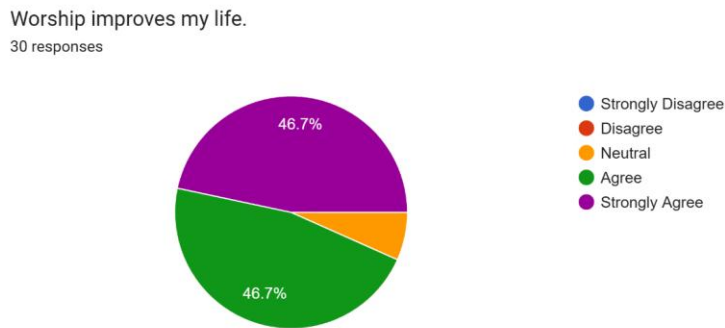


Figure 6: Responses to Survey Question 6

As Figure 6 indicates, 93.4% of respondents agreed or strongly agreed with that statement with only 6.7% remaining neutral and none disagreeing. Overall, there was a strong positive relationship to worship from respondents which is not surprising given that these were people already connected to the congregation.

For the first Likert scale that was after a typical worship service on April 6, 2025, only one question was added. I asked whether they had attended the worship service in-person or via livestream. 27 people answered this second survey. One of the constraints of my research is that there were people who were unable to complete all 4 surveys. In fact, only 17 of the 30 people who signed up to be surveyed were able to attend all three worship services and fill out surveys after each. Regular worship attendance would definitely be a thing to consider with any intervention that requires weekly attendance. The results for the original survey are presented in Appendix A.

Of the 27 people who responded to the survey about a typical worship service, 17 of them filled out the survey on Sunday directly after worship. The others filled out the survey later in the

week. I had paper copies of the survey available for those who wanted to take the survey that way and there was also an email that went out to all 30 participants at the conclusion of worship with a link to the survey. All but 2 filled out the survey online.

From the control regular worship service survey, 69.2% agreed that they felt a strong capacity for joy, 26.9% strongly agreed and 3.8% were neutral. There was an increase in responses simply from filling out the survey closer to the worship experience. All agreed or strongly agreed that they felt able to be compassionate to others and 84.6% agreed or strongly agreed that they felt able to be compassionate to themselves. 15.4% were neutral. 88.9% agreed or strongly agreed that worship increased joy in their life while 11.1% were neutral which is again an increase from the first survey. 96.2% agreed or strongly agreed that worship increased their ability to be compassionate while 3.6% disagreed. After the control worship service, all respondents agreed or strongly agreed that worship improved their life. The bulletin for this worship service is Appendix B. The results for this survey are presented in Appendix C.

For the second worship service on May 4, 2025, there were changes to the bulletin that shared some of the neuroscience behind each part of worship. These notes were in sideline columns of the bulletin. There was also a copy of all of the sideline notes on one page for anyone to take home if they wished. This is Appendix D. I announced during the welcome at the beginning of the service that the bulletin was different but otherwise led the worship service with no difference.

There were 24 responses to the survey after this worship service with a different bulletin. After this worship service, only 75% agreed or strongly agreed that they had a strong capacity for joy. 20.8% were neutral and 4.2% strongly disagreed. These results show that overall, the participants were less confident in their capacity for joy than after a regular worship service. One

of the constraints of my survey is I can see that they were feeling less of a capacity for joy but I don't know why. Were they having a bad day? Was there something about the bulletin that influenced them? I don't know.

95.8% agreed or strongly agreed that they were able to be compassionate with 4.2% being neutral. None disagreed. 91% felt able to be compassionate to themselves with 8.3% feeling neutral. 91.7% agreed or strongly agreed that worship increased joy in their life, 8.3% were neutral and none disagreed. 87.5% agreed or strongly agreed that worship increased compassion in their life with 12.5% being neutral. 95.9% agreed or strongly agreed that worship improved their life with 4.2% being neutral. This intervention didn't have a positive impact. The same number of participants took the survey directly after worship on Sunday (17). I heard positive anecdotes from folks about liking the bulletin but the results of the survey do not show an improvement. The bulletin for this worship service is Appendix E. The survey results are Appendix F.

The second intervention on May 11, 2025 was to keep the bulletin the same as a typical worship service but as the pastor to introduce the neuroscience concepts verbally and to lead several exercises. 25 people filled out this survey. 87.5% agreed or strongly agreed that they had a strong capacity for joy. 12.5% were neutral. All agreed or strongly agreed that they felt able to be compassionate to others. 91.7% agreed or strongly agreed that they felt able to be compassionate to themselves. 8.3% were neutral. 91.7% agreed or strongly agreed that worship increased their capacity for joy with more in the strongly agree category than the previous question. Same results for worship increased their capacity for compassion as the week before. Same results for worship improved my life as the week before. Went down again. The bulletin

for this worship service is Appendix G. The words I used is Appendix H. The survey results are Appendix I.

These results show that there was not necessarily a positive change in how respondents answered the survey questions after each worship service with an intervention. When I looked at individuals, the numbers were slightly more positive. Of the 30 participants, 1 person only filled out one survey. Of the rest, 11 people had a mix of answer where they either stayed the same or were less confident in their capacity for joy and compassion. The other 19 did report a positive change in their belief in their capacity for joy and compassion.

I am curious about the reasons that the survey didn't show more positive change. Because each intervention was only one week, there was not a chance for the change to grow over time. Perhaps the respondents were caught on a day when they were not interested or open to these interventions. The interventions themselves could have been not helpful for this particular congregation. Because these interventions were a change to the bulletin format or to the worship leadership, it could be that the responses reflect as much a resistance to any change rather than the specific interventions themselves. These were already people who valued and responded well to worship. There are so many variables as to why these particular interventions aiming to increase the positive capacity for joy and compassion of the respondents did not show immediate results.

In this chapter, I explored the creation of my survey tools and interventions in an attempt to measure whether changes in worship design might lead to worship participants sensing an increase in their capacity for joy and compassion and whether they could see worship as a connection to those increased capacities. I reviewed my findings and determined that they were inconclusive.

Chapter 4

Conclusion and Recommendations

Worship that draws on positive practices derived from and informed by neuroplasticity can be enhanced and therefore have a more transformative effect on worshippers. Worship can be designed to reinforce the positive wirings of our brains to help us experience more joy and compassion. Sunday morning worship is still the primary way that Christians within the Presbyterian Church, (USA) practice their faith together. We can use what neuroscientists are learning to tweak our worship experience; remain faithful to our Reformed theology, while also trying new practices that may lead to even greater positive brain changes.

In this project, I made one attempt at making changes to worship design that would test this hypothesis. My results were inconclusive. One of the factors that I believe led to this was that this was a one-time experiment. With any muscle change, the same practice done consistently over time leads to more results. I can imagine a future experiment that has the same practices each week in worship for weeks at a time. This may lead to different results.

Another factor was that I was surveying a group of people for whom worship already creates a sense of joy, compassion and a positive impact upon their life. Based on the initial survey, there wasn't much room for the participants to report a higher capacity for joy and compassion although a few did report modest positive changes. It would be interesting in the future to conduct a series of experiments with people for whom current Presbyterian worship is not currently working. Finding this audience would be challenging. I can envision interviewing folks for whom traditional worship does not currently feel transformative and then crafting some

practices that would address their goals while tying those practices to Reformed theology. This would be another worthy experiment.

Finally, I incorporated changes that seemed the least disruptive based on the culture of the church I was serving. Even so, there were those who spoke to me after these experiments and told me they were inappropriate for traditional worship while others shared that they enjoyed the interventions. There are other interventions that would be more outside of the box for a church that has traditional worship practices but might lead to different results. I can imagine a worship experience that incorporates more bodily movement which has shown to positively impact neuroplasticity. I can imagine a worship experience that has participants write things down which is another practice that has shown positive impact on our brain wiring. In a different church context, other interventions might be able to be explored with less resistance.

Upon reflection, in a future context with more time, I would begin by introducing how these practices are in line with John Calvin's understanding of worship. I would spend time teaching about how these practices are a part of a long lineage of worship practices. The founder of Presbyterianism, John Calvin, said in chapter 1 of his *Institutes of the Christian Religion*, "Nearly all the wisdom we possess, that is to say, true and sound wisdom, consists of two parts: the knowledge of God and of ourselves. But, while joined by many bonds, which one precedes and brings forth the other is not easy to discern."⁷⁰ Effectively, we are to know God and be known by God and we are to know ourselves. The more we can know about ourselves – our

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⁷⁰ John Calvin, *Institutes of the Christian Religion*, translated by Ford Lewis Battles (Westminster Press, 1960), 35.

motivations, our places of growth, our ways of experiencing joy and compassion – the better our connection will be to God whom we desire to know and be known by.

By focusing on knowing and transforming ourselves so that we might come to better understandings of God, I would focus on the foundational capacities that are necessary in order to begin to work on our interior lives. Intention is a key component. If we, like John Calvin, have an intention of knowing God and knowing ourselves, that intention can lead us to practices that will help us with that awareness.

As writer adrienne marie brown has shared,

There's so much awakening, so I always tell people that you're always practicing things. So it's not like you go from not practicing to practicing; but it's, Are you practicing things on purpose? Are you practicing things you would want to practice, or are you practicing what someone else has told you is the right way to do stuff? And once you start practicing on purpose, then you can actually practice liberation and justice and freedom and — then I think you begin to have this contentment that comes from practice.⁷¹

A contentment that comes from practicing what we believe will help us grow in joy and compassion is my aim. I want to keep incorporating what I am learning about neuroscience into worship. For example, I can imagine a worship series with affirmations from the Bible about our identity in God that could use what we know about repeated affirmations to change people's perceptions of themselves.

In any future experiments, I would have the time of study be much longer. I would also attempt to have as my survey participants those who are not currently attending Presbyterian

⁷¹ adrienne maree brown, “On Radical Imagination and Moving Towards Life,” interview by Krista Tippett, *On Being with Krista Tippett*, June 23, 2022, last updated July 3, 2024, <https://onbeing.org/programs/adrienne-maree-brown-on-radical-imagination-and-moving-towards-life/>.

worship. In any data collection mechanism, I would define what I am talking about when I talk about joy and compassion so that all participants could have a common understanding. I think it would be most helpful for the data gathered to be interviews with participants rather than a Likert scale. I think it would help better understand why respondents are responding the way they are and what their experiences really were like. The Likert scale was an attempt to measure how each participant was feeling immediately after each worship service. However, without defined definitions for some of the key terms and with the subjectiveness of the scales being different for each individual, I would not use Likert scales for future projects. My ultimate goal is to learn whether long term practices in worship have impacts on the behavior of worshippers throughout their week. This would be better accomplished by interviewing participants than with questionnaires immediately following worship.

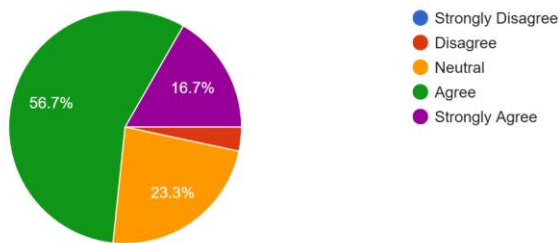
Another possible way to collect data given funds and congregational buy-in would be to have congregants wear heart monitors while they were in worship. Over many weeks, differences in heart rates could be tracked to see if or when in worship there were increases or decreases in heart rates.

As Irenaeus said in the 2nd century, “The glory of God is the human person fully alive.”⁷² To be fully alive is to be filled with God’s presence and to exhibit the qualities of Jesus such as compassion and joy. The learnings of neuroscience can help the church to live more fully into its calling to transform lives.

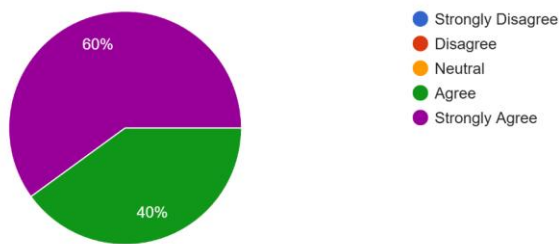
⁷² James F. White, *Introduction to Christian Worship* (Abingdon Press, 2000), 24.

Appendix A: Initial Survey Results

I feel a strong capacity for joy.
30 responses

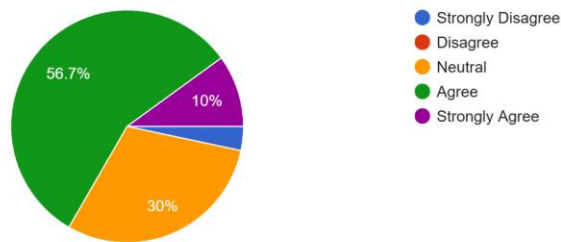


I feel able to be compassionate to others.
30 responses



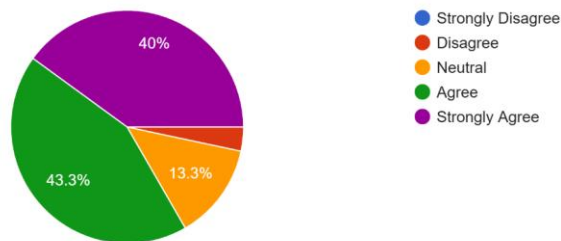
I feel able to be compassionate to myself.

30 responses



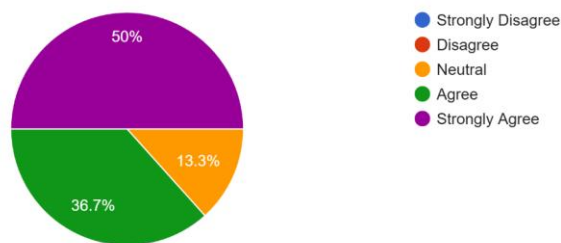
My participation in worship leads to increased joy in my life.

30 responses

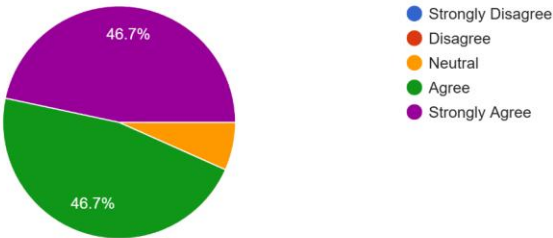


My participation in worship leads to increased compassion in my life.

30 responses

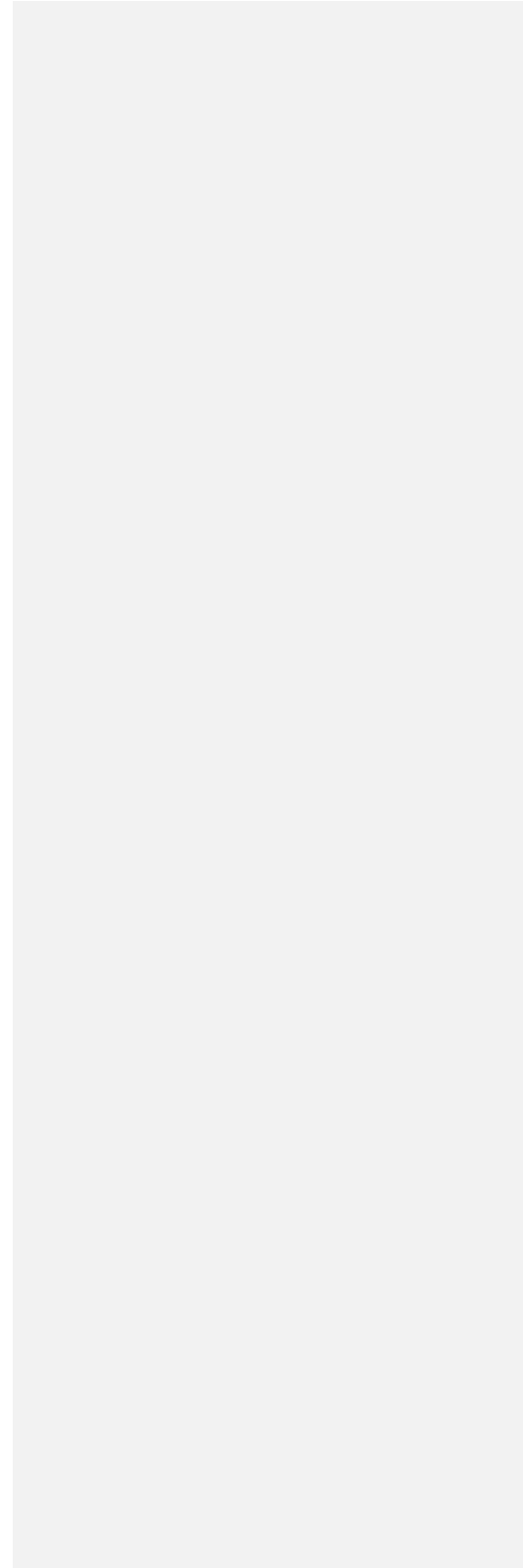


Worship improves my life.
30 responses



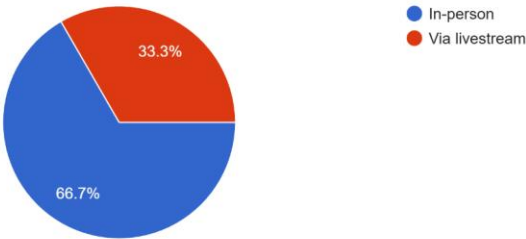
Appendix B: Bulletin for Worship April 6, 2025

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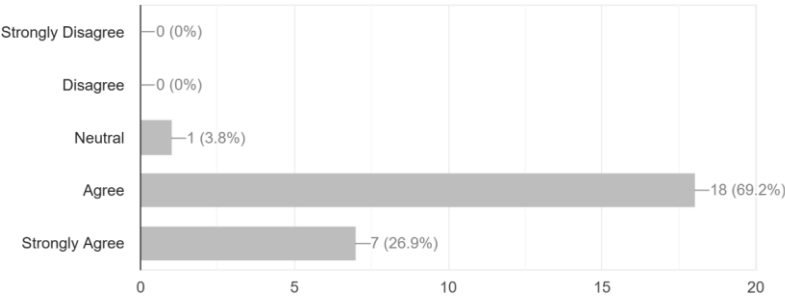


Appendix C: Survey Results for After Worship April 6, 2025

I attended worship:
27 responses

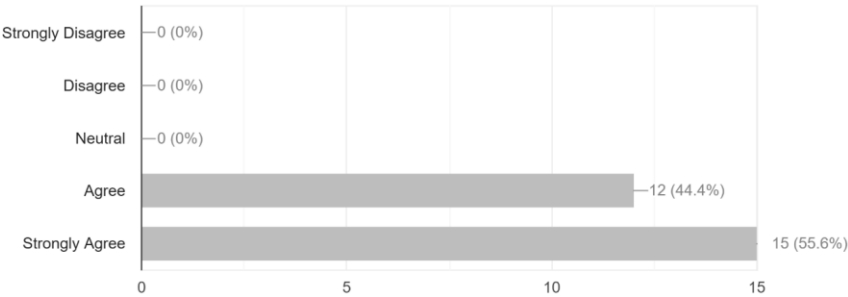


I feel a strong capacity for joy.
0 / 26 correct responses



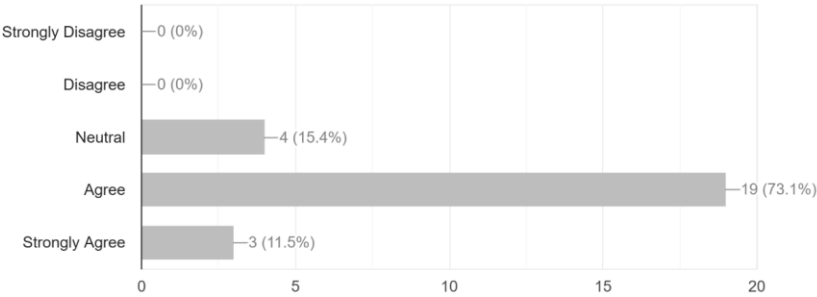
I feel able to be compassionate to others.

0 / 27 correct responses



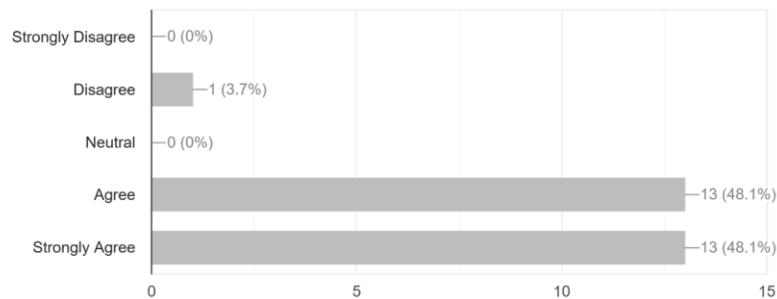
I feel able to be compassionate to myself.

0 / 26 correct responses



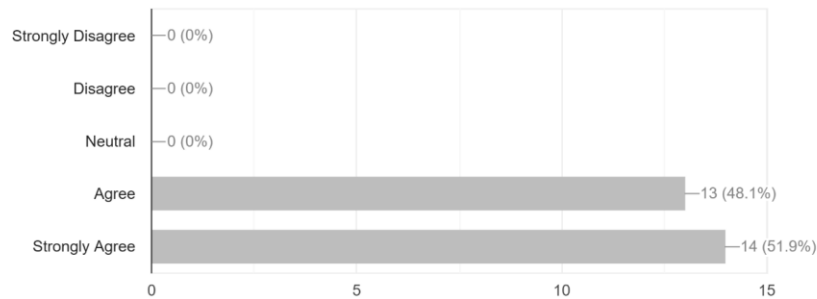
My participation in worship has increased compassion in my life.

0 / 27 correct responses



Worship has improved my life.

0 / 27 correct responses



Appendix D: Sidebar Text for May 4, 2025, Bulletin with References

Resources for Positive Neuroplasticity in Worship

Rev. Heidi Bolt

Gathering

(Welcome and Announcements) We prepare for our time together. As we focus on our breathing, we can cultivate a posture of relaxed alertness that will help us balance our autonomic nervous system. Focusing on our breath can activate the parasympathetic branch in our nervous system which can lower blood pressure and cortisol levels and increase our creativity and executive function among many other benefits.⁷³

(First Hymn) Music is in every known mapped part of the brain. Singing together can reduce chronic pain, increase attitudes of generosity and levels of oxytocin in the brain.⁷⁴

(Passing of the Peace) Smiles and the good feelings associated with them are neurologically contagious.⁷⁵

⁷³ Roderik J. S. Gerritsen and Guido P. H. Band, "Breath of Life: The Respiratory Vagal Stimulation Model of Contemplative Activity," *Frontiers in Human Neuroscience* 12 (October 9, 2018): 3, article 397, <https://doi.org/10.3389/fnhum.2018.00397>.

⁷⁴ Collins, "Opera Legend Renee Fleming."

⁷⁵ Andreas Hennenlotter et al., "A Common Neural Basis for Receptive and Expressive Communication of Pleasant Facial Affect," *NeuroImage* 26, no. 2 (2005): 581-591, <https://doi.org/10.1016/j.neuroimage.2005.01.057>.

The Word

(Sermon) Meditation can increase compassionate responses to suffering.⁷⁶

(Second Hymn) Singing together releases endorphins and mitigates feelings of loneliness.⁷⁷

Responding

(Pastoral Prayer) People who pray together accelerate the rate at which fellow worshippers activate neuropathways of a prayerful state.⁷⁸ Structured prayers like the Lord's Prayer reduce our respiration rate.⁷⁹

Sending

(Third Hymn) Singing has been shown to synchronize the heartbeats of those singing together and create a sense of community and social inclusion.⁸⁰

(Benediction) When we stimulate a neural circuit, we strengthen it. Taking in the good helps us to strengthen our ability to savor the positive in our lives.⁸¹

⁷⁶ Paul Condon et al., "Meditation Increases Compassionate Responses to Suffering," *Psychological Science* 24, no. 10 (2013): 2125-2127, <https://doi.org/10.1177/0956797613485603>.

⁷⁷ R. I. M. Dunbar et al., "Performance of Music Elevates Pain Threshold."

⁷⁸ Miller and Schwall, *The Awakened Brain*, 198.

⁷⁹ DeStono, *How God Works*, 100.

⁸⁰ DeStono, *How God Works*, 101.

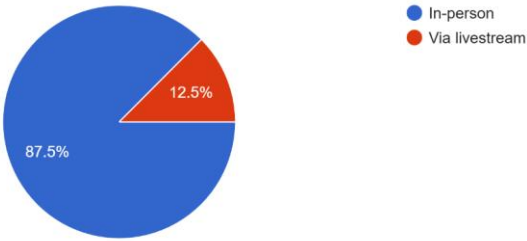
⁸¹ Hanson, *Hardwiring Happiness*, 10.

Appendix E: Worship Bulletin for May 4, 2025

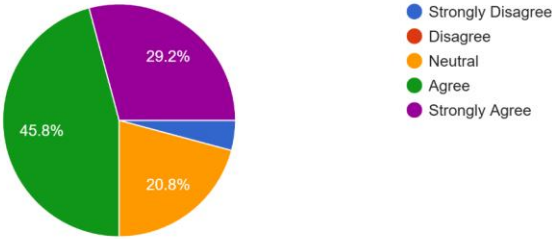
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Appendix F: Survey Results for May 4, 2025

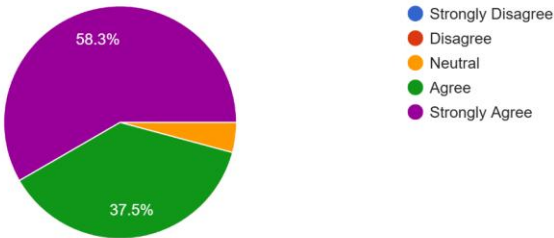
I attended worship:
24 responses



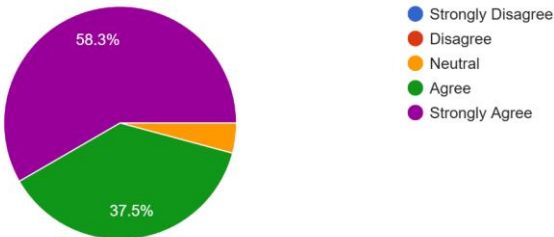
I feel a strong capacity for joy.
24 responses



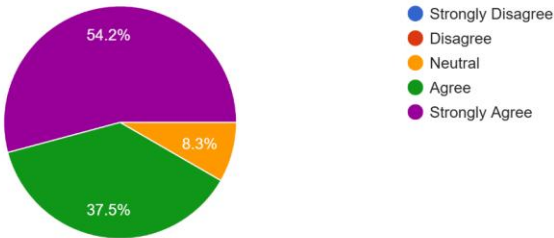
I feel able to be compassionate to others.
24 responses



I feel able to be compassionate to others.
24 responses

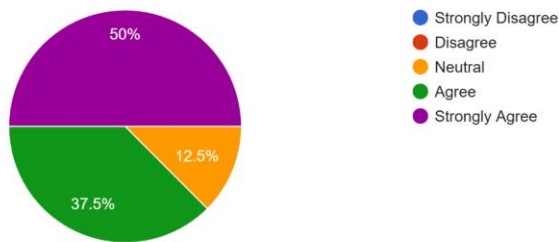


My participation in worship has increased joy in my life.
24 responses



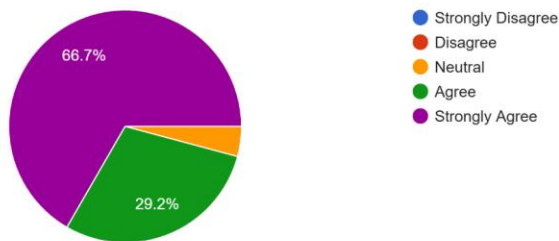
My participation in worship has increased compassion in my life.

24 responses



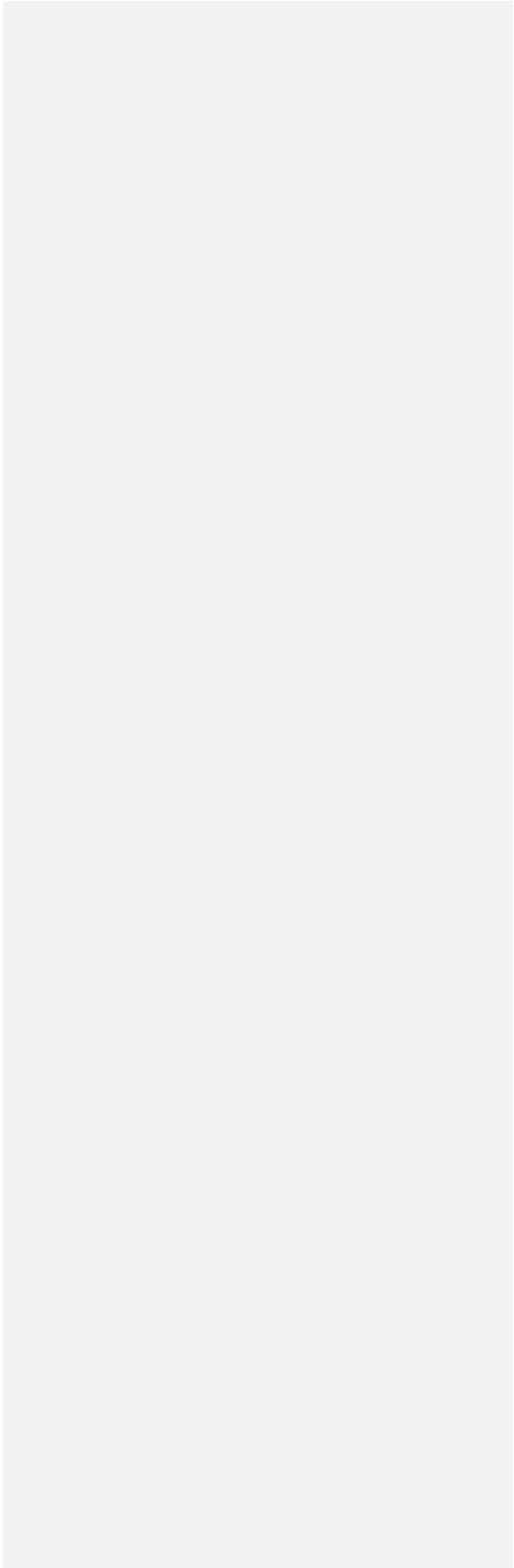
Worship has improved my life.

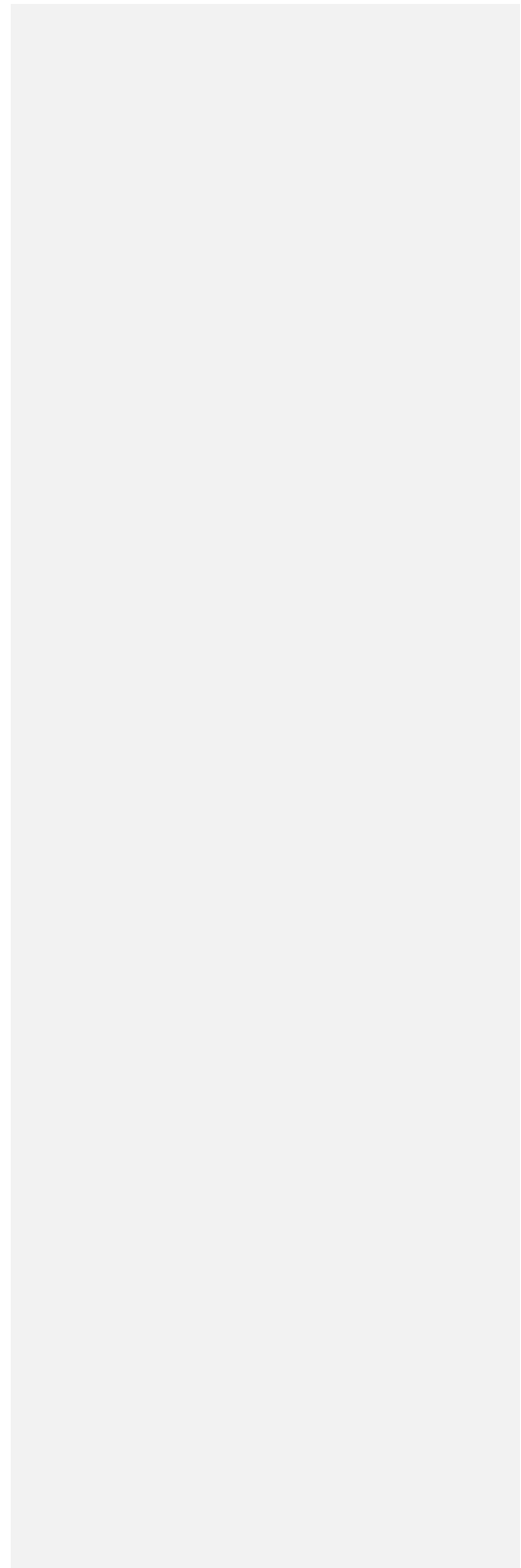
24 responses

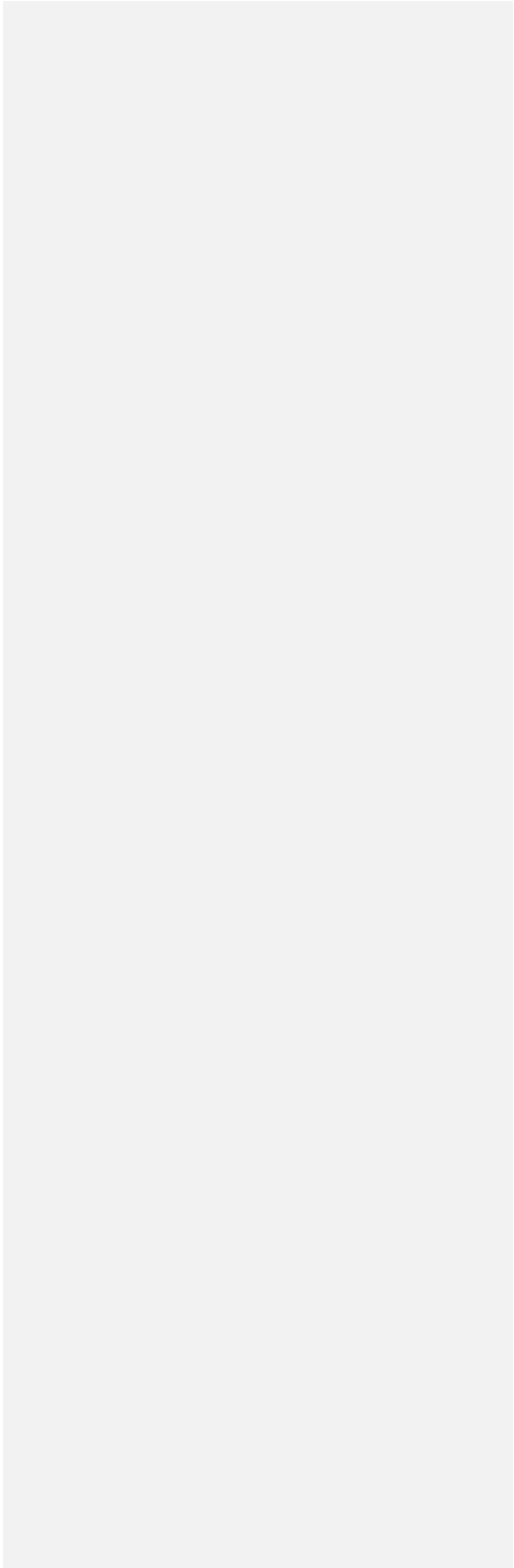


Appendix G: Worship Bulletin for May 11, 2025

10







Appendix H: Manuscript for Worship Elements for May 11, 2025

Announcements:

Adrienne Maree Brown says, “What a time to be alive.” Lin Manuel Miranda says, “How lucky we are to be alive right now.” As we begin this service, can you take the deepest breath you’ve taken all day with me right now. The Spirit, pneuma in Biblical Greek, ruach in Biblical Hebrew, is also the word for breath, your life force. Focusing on your breath can help you be here now, bringing your awareness to what we will do together in this hour. Let us pause, let us reflect on the miracle it is that we are here together now, let us worship Almighty God.

Invitation to Confession:

Being recreated in the image of God requires loss and death of the sinful ways in which we have lived. Neuroscience shows us some mechanisms by which we rid ourselves of old habits and old ways, of unhelpful and harmful pathways and the way we create connections that can lead to wholeness. One of the ways we can come to confession is knowing we can repent because our brains are being restructured. The plasticity of our brains permits us to recognize our sinfulness and find ways to change. We truly can turn from our sinful ways and turn to God. Confident not only in the possibility of sanctification but also in the grace we have received through faith, let us confess our sin so that we might be on a path toward reconciliation and wholeness:

Passing of the Peace:

I want to tell you about mirror neurons. Do you know about mirror neurons? I've been learning about the research around the power of mirror neurons, that these are cells in the brain that are activated when they see someone doing something.

So for example, if someone looks you in the eye and smiles at you for 7 seconds, 80-85% of you will not be able to control yourselves and you will smile right back even if you try not to. You can't help it. Your mirror neurons are seeing someone else smiling and they tell your brain “We're smiling” and so you begin to smile. As we pass the peace, our goodwill towards one another is neurologically contagious. You are improving the brain health of your neighbor in the pew!

Sermon:

My sheep hear my voice. I know them and they follow me.

These are beautiful words in our Scripture today about our relationship with Jesus and how we experience Jesus as the shepherd who leads and guides us. The shepherd who leads us besides still waters and restores our soul.

For a few hundred years, the church has prioritized the way we get to know Jesus as through our intellect, through teaching, through preaching, through you sitting there and listening and the preacher standing up here and sharing what they’ve discovered in their study of the Scripture. And this is not a bad way to communicate so many wonderful things about God and Jesus and the Holy Spirit and the saving grace found in faith. And sermons over the centuries have touched people’s hearts and minds.

But one of the things neuroscience is teaching us is that as humans, embodied practices that engage our senses (like singing, passing of the peace, baptism, communion)

these actually have a greater positive influence on our neural networks than when we simply sit and listen.

Maybe you've heard the old joke. A tourist goes to New York to attend a concert, but gets lost. They spot another pedestrian who's carrying a violin case. "Excuse me, can you tell me how to get to Carnegie Hall?" The musician smiles and says, "Practice, practice, practice."

And so today, we are going to practice. Because I don't want you to know Jesus just on an intellectual level. I want you to know in your bones that Jesus is a shepherd who can be trusted. That you are known and loved by God in a profound way.

So we will start with a parasympathetic nervous system reset. These help us relax and be more fully in this moment. Box breath.

Next we are going to do a visualization exercise. For some, this might be most easily done by closing your eyes. For others, doodling on your bulletin might help you, for others just writing word down as I talk might be most helpful. Do what's best for you.

As you stay relaxed, hear Jesus say these words. My sheep hear my voice. I know them and they follow me. When is a time that you have heard God's voice or sensed God's guidance? As you think of a time, put as much detail into the memory as you can. Who was there? What time of day or year what it? What were you wearing? How did you hear God? What happened in your body? What did you do?

Rest in the presence. Notice what you are feeling right now.

As we move from reflecting on a time when you heard God's voice, envision yourself sometime in the future if you were able to hear Jesus' voice more clearly. What would it feel like? How would you walk through the world? What would you do differently?

Notice how you feel. Come back into the room.

My sheep hear my voice. I know them and they follow me.

No one will snatch. No one will never never snatch them. We are held in God's presence.

Frederick Dale Bruehner: As the new community, we are not only called to be Christocentric . Christo-phonic. We are called to be Christ listeners. Listen for the voice of the shepherd. The shepherd knows us and we experience the presence of the shepherd. We follow him, we walk along with this one who leads us.

As we practice resting in God's presence, remembering when God has been present and imagining a future of God's presence, today's thoughts build tomorrow's brain.

May you know deeply, in every fiber of your being, that you are held in the presence of God's love and care and may you continue to listen for God's voice. May it be so. Amen.

Prayers of the People:

We are going to offer our prayers a little differently this morning. Studies have shown that when you put two people in fMRI machines in two different rooms and one prays for the other, the person in a whole other room has parts of their brain that light up as if they were in the room receiving the prayer.

There is a non-locality to our brain connections that science is only beginning to understand. So today, we are going to pray as if we believed that our prayers could positively impact the brains of those we are praying for. That wherever they are in the world, our prayers could positively impact their brains on a cellular level. As we pray, I'd like you to bring to mind a particular person or group of people and send your prayers to them.

May this season plant seeds of new life and yield growth and maturity in Christ. May the gift of your Spirit be our steady leader and faithful friend.

For mothers – mothers we know, or mothering figures

For a friend in need –

For people in war zones –

For governmental leaders –

For those struggling with addiction –

For those who are lonely –

For someone we dearly love –

Use all of our prayers to strengthen us and to positively impact the world. Move our hearts with compassion, justice and love. We praise you, Savior God. Blessing and glory and wisdom and thanksgiving and honor and power and might be to our God forever and ever! (Revelation 7:12)

As the Body of Christ, hear us now as we pray as Christ taught us, “Our Father ...”

Benediction:

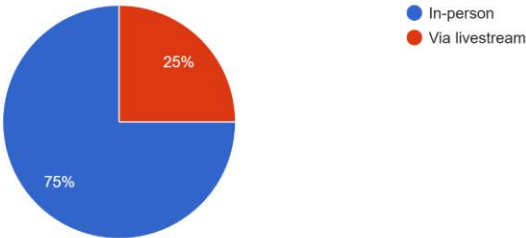
When we stop to take in the good, it helps re-wire our brains to be able to notice more goodness all around us. We’re going to take 60 seconds to take in the good of this moment.

Taking in the Good: Page 176

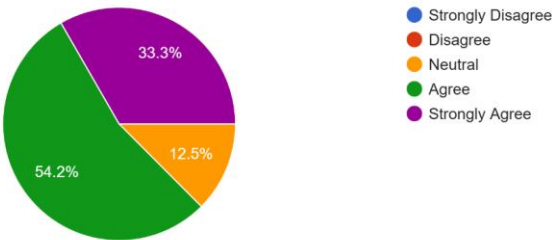
Hanson, Rick. 2013. *Hardwiring Happiness: The New Brain Science of Contentment, Calm, and Confidence*. Harmony Books. For the Humanities style, it is: Hanson, Rick. *Hardwiring Happiness: The New Brain Science of Contentment, Calm, and Confidence*. Harmony Books, 2013.

Appendix I: Survey Results for May 11, 2025

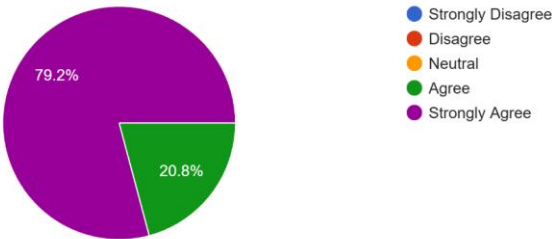
I attended worship:
24 responses



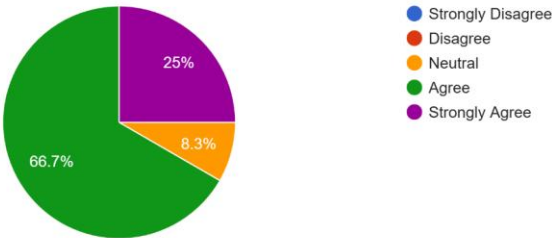
I feel a strong capacity for joy.
24 responses



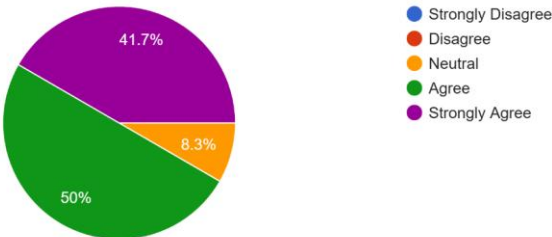
I feel able to be compassionate to others.
24 responses



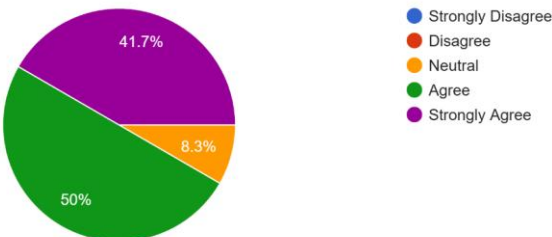
I feel able to be compassionate to myself.
24 responses



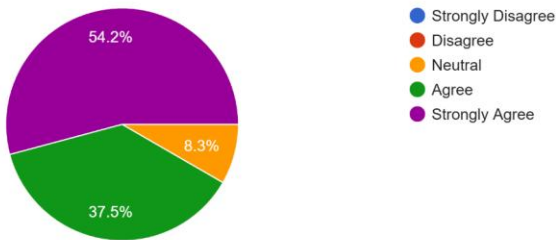
My participation in worship has increased joy in my life.
24 responses



My participation in worship has increased compassion in my life.
24 responses



Worship has improved my life.
24 responses



Appendix J: Example of Consent Form

Letter of Informed Consent

Identification of Investigator and Purpose of Study

You are invited to participate in a research study, entitled “Reformed Worship Design Incorporating Positive Neuroplasticity.” The study is being conducted by Heidi Bolt under the supervision of Dr. Andrew Dreitcer of Claremont School of Theology, 1325 N. College Ave; Claremont, CA 91711, Adreitcer@cst.edu, 415-847-7468.

The purpose of this research study is to examine the impact of worship design on a participant’s sense of being able to increase their capacity for joy and compassion.

Your participation in the study will contribute to a better understanding of worship design using positive neuroplasticity. You are free to contact the investigator using the information below to discuss the study.

Heidi Bolt, 2405 Saginaw St. S, Salem, OR 97302, Heidi.bolt@cst.edu, 541-350-8241.

You must be at least 18 years old to participate.

If you agree to participate:

- The worship services will consist of approximately one hour, three times.
- Your participation is intended to study changes in worship design and their impact on neuroplasticity.
- Your participation will consist in participating in three worship services and filling out a questionnaire after each one.
- You will not be compensated.

The purpose of this study is to gain insight into practical theology, pastoral care and/or spiritual care. Participation in this study should not be regarded as—or substituted for—therapy by a licensed professional.

Risks and Confidentiality of Data

There are some possible risks or discomfort which could cause you to feel uncomfortable, embarrassed, sad, tired, etc. If you would like to talk to a pastor about your experience of these worship services, I or another pastor will be available to you to process your experience. There will be no costs for participating. Your name, email address and other personally identifiable information will not be kept after the data collection phase. No personally identifiable

information will be publicly released. Your personal information, if collected, will be used solely for tracking purposes. A limited number of research team members will have access to the data during data collection. Those research team members are: Heidi Bolt.

When the results of the research are published or discussed in conferences, no information will be included that would reveal your identity. If photographs, videos, or audio-tape recordings of your participation are used for educational purposes, your identity will be protected or disguised. Your information will be stored until graduation June 2026 and then destroyed.

Participation or Withdrawal

Your participation in this study is voluntary. You may decline to answer any question and you have the right to withdraw from participation at any time. Withdrawal will not affect your relationship with Claremont School of Theology in any way. If you do not want to participate, you may simply stop participating.

Contacts

If you have any questions about the study or need to update your email address contact the primary investigator Heidi Bolt at 541-350-8241 or send an email to Heidi.bolt@cst.edu, or contact the advisor Dr. Andrew Dreitcer at 415-847-7468 or email to a.dreitcer@cst.edu. This study has been reviewed by Claremont School of Theology Institutional Review Board and the study number is 2024-0301.

Questions about your rights as a research participant.

If you have questions about your rights or are dissatisfied at any time with any part of this study, you can contact, anonymously if you wish, the chair of the Institutional Review Board by email at irb@cst.edu.

Thank you.

Name _____

Email _____

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